



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/020,911	12/19/2001	Gilroy J. Vandentop	2207/12665	8839

23838 7590 06/18/2003

KENYON & KENYON  
1500 K STREET, N.W., SUITE 700  
WASHINGTON, DC 20005

EXAMINER

ZARNEKE, DAVID A

ART UNIT

PAPER NUMBER

2827

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/020,911

Applicant(s)

VANDENTOP ET AL.

Examiner

David A. Zarneke

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 5-13 and 17-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 14-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 December 2001 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

In the election dated April 22, 2003, Applicant elected "the species recited in claim 1 and the claims that depend therefrom."

This election is incomplete since claims 5-13 are directed to another species (claims 17-22). Therefore, the examiner is going to assume that these claims were intended to be removed from the examined group. This leaves claims 1-4 and 14-16 as the claims presently examined.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Fan et al., "Copper Wafer Bonding", *Electrochemical and Solid State Letters*, 2 (10), pp. 534-536, 1999.

Applicant's admitted prior art teaches a method of fabricating an electro-optic package comprising:

providing an IC wafer having one or more IC contact pads, the IC pads being connected to an IC on the wafer;

providing an intermediate wafer having one or more intermediate contact pads, the intermediate contact pads being connected to an electro-optic arrangement on the intermediate wafer ([0003]-[0005]).

Applicant's admitted prior art fails to teach direct copper bonding the IC contact pads to adjacent intermediate contact pads, the electro-optic semiconductor package resulting.

Fan teaches the use of direct copper bonding to attach device wafers.

Even though Fan does not teach the connecting one wafer to another wafer having an electro-optic arrangement thereon, it would have been obvious to one of ordinary skill in the art to use the direct copper bonding of Fan in Applicant's admitted prior art because Fan teaches that interconnect delays are significantly reduced and system performance is increased (first paragraph).

As taught by Fan, direct copper bonding is known in the art. Therefore, the present invention is a new use for a known method. Merely finding a new application for a known method is unpatentable.

The use of old process steps employing new materials is unpatentable. *In re Maxwell et al.*, 89 USPQ 387 (CCPA)

Regarding claims 2-4, Fan teaches cleaning the contact pads in an acid bath (claim 3), disposing the IC contact pads adjacent the intermediate contact pads in an oxidation-resistant environment comprising a nitrogen purge (claim 4) having a predetermined ambient temperature, and forcing the IC contact pads into direct contact

with the adjacent intermediate contact pads at a predetermined temperature, resulting in a direct copper bond (under the heading Experimental).

With respect to claim 14, Applicant's admitted prior art teaches a computer processor wafer having one or more contact pads ([0003]).

As to claim 15, Applicant's admitted prior art teaches providing a chip interposer as the intermediate wafer ([0003]).

Regarding claim 16, Applicant's admitted prior art teaches providing a host wafer as the intermediate wafer ([0003]).

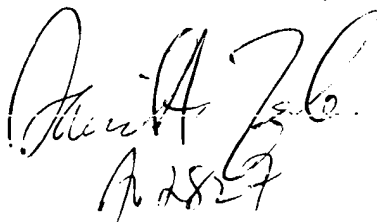
### **Conclusion**

Any inquiry concerning this communication from the examiner should be directed to David A. Zarneke at (703)-305-3926. The examiner can normally be reached on M-F 10AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703)-305-9883. The fax phone numbers for the organization where this application is assigned are (703)-308-7722 for regular communications and (703)-308-7721 for After Final communications.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist whose telephone number is (703)-308-0956.

David A. Zarneke  
June 16, 2003

Handwritten signature of David A. Zarneke and Art Unit 2827.